

FMAN85 COMPUTER VISION (6hp)

Period 3, 2020

Lecturer: Carl Olsson, tel. 046-222 85 65, email carl.olsson@math.lth.se, room MH:435.

Lectures: Carl Olsson

Tuesdays 8–10. MH:Gårdingsalen

Wednesday 10–12 (study weeks 1–6). MH:Gårdingsalen.

Q&A-sessions: Patrik Persson & Marcus Valtonen Örnåhag

Mondays 10–12 (study weeks 2–6). MH:230.

Assignments: There are five mandatory assignments. They contain both exercises that should be solved by hand and computer exercises. You can get help with these (and work with them) during the Q&A-sessions. See last page for more details on assignment rules.

Course Literature:

Lecture notes will be available from the course homepage. (In addition a few scientific papers might be handed out during the lectures.)

Course homepage: <https://canvas.education.lu.se/courses/3379>

Registration: Use Studentportalen. Re-registrations cannot be done through Studentportalen but has to be done manually by the administrators. Other problems with registration are also handled by the administrators (send an email to expedition@math.lth.se).

Project: It is possible to extend the course with 3 additional credits by doing a project in applied mathematics (FMAN40). A list of possible projects will be available at the course homepage. It is also possible to suggest your own ideas for projects.

Examination: Grade 3 (pass) requires that all home assignments have been handed in and been approved.

To achieve a higher grade (4 or 5) you also need to complete the take-home-exam and the oral exam. The exam will be handed out whenever you choose in study week 8 or in the exam week. However, it should be completed within 48 hours after collecting it. (That means that you can't keep it during the weekend).

Student Reception:

The student reception of Mathematics LTH is located on the fifth floor (room MH:540) in the mathematics building. The course administrator is Eva-Lena Borgström, tel. 046-222 85 30, email expedition@math.lth.se.

Preliminary plan for lectures (L), assignments (A) and Q&A-sessions (Q&A).

The following is a suggested work plan for the course, which includes when to solve the mandatory exercises in the assignments. You will find the exercises (E) and computer exercises (CE) in each assignment on the home page. It is of course up to you if you want to follow the suggested plan or not as long as you make the deadlines. However, in order not to fall behind I strongly suggest that you do not deviate too much from it. Note that the amount of work varies between assignments. In particular assignments 2 and 3 contain a lot of work.

21/1	L 1	MH:Gårding	... Course information, Introduction, The pinhole camera
22/1	L 2	MH:Gårding	..... Homogeneous coordinates and projective geometry
	A 1		..... All (mandatory) exercises
27/1	Q&A 1	MH:230	..... Questions on assignment 1
28/1	L 3	MH:Gårding	..... Camera calibration, DLT, SVD
	A 2		..... E1,CE1,E2,E3,E4,E5,CE2
29/1	L 4	MH:Gårding	..... Triangulation, Homographies, Radial distortion
	A 2		..... E7,CE3,CE4,CE5
3/2	Q&A 2	MH:230	..... Questions on assignment 2
4/2	L 5	MH:Gårding	..... Epipolar geometry, The fundamental matrix
	A 3		..... E1,E2,E3,CE1,E4,CE2
5/2	L 6	MH:Gårding	..... Cameras from F, The essential matrix
	A 3		..... CE3, E6, CE4
	A 1		..... Assignment 1 due this week.
10/2	Q&A 3	MH:230	..... Questions on assignment 3
11/2	L 7	MH:Gårding	..... Model fitting, reprojection errors, robust metrics
12/2	L 8	MH:Gårding	..... RANSAC, minimal solvers
	A 4		..... All (mandatory) exercises
	A 2		..... Assignment 2 due this week.
17/2	Q&A 4	MH:230	..... Questions on assignment 4
18/2	L 9	MH:Gårding	..... Reconstruction and optimization
	A5		..... All (mandatory) exercises)
19/2	L 10	MH:Gårding	... Subspace learning, Affine cameras, Deformable models
	A 3		..... Assignment 3 due this week.
24/2	Q&A 5	MH:230	..... Questions on assignment 5
25/2	L 11	MH:Gårding	..... Global optimization in Structure from Motion.
26/2	L 12	MH:Gårding	..... Stereo and Surfaces. Project introductions.
	A 4		..... Assignment 4 due this week.
3/3	L 13	MH:Gårding	..... Repetition. Old exams.
	A 5		..... Assignment 5 due this week.

General Assignment rules:

Deadlines are firm and reports are to be handed in on time through the canvas page. The reports should be written individually, however you are encouraged to work together. Keep in mind that everyone is responsible for their own report and should be able to explain all the solutions. (Exactly what should be submitted is stated in the assignment instructions.) Not everything has to be correct the first time you hand in however you have to present solutions/attempts for each mandatory exercise. It is not ok to hand in blank solutions. (If you have problems solving something you should come to the Q & A-sessions or contact the lecturer by email in good time before the deadline.) In exceptional cases extensions can be offered (due to unforeseen circumstances). In such cases contact the lecturer by email before the deadline (or as soon as possible) for instructions on what to do.

After solutions have been handed in the assignment will be corrected and you will receive feedback on what needs to be improved. You then submit a revised version of your solutions. Make proper revisions, partial or minimal corrections that results in continued iteration of the revision process will not be accepted. We do not have a strict limit on the number of revisions that you can make, but cases with no/minimal improvements will be not be corrected or approved. (If you have problems come to the Q & A-sessions or contact the lecturer.) **The final deadline for getting all the assignments approved (after revisions) is April 1.** Assignments not approved by this time can be resubmitted in the exam period in August.

The assignments contain some optional exercises. You do not have to do these to pass. However if you submit good solutions to these you can be awarded 0.2 bonus points for the home exam. Since there are five assignments this can yield at most 1 bonus point in total. (The home exam has 6 tasks worth 1 point each and the final grade is the total score, counting bonus from the assignments, rounded down to 4 or 5. Scores below 4 give final grade 3 if all the assignments are approved.) The bonus is determined from the first submission of the report. That is, if you do not get the full 0.2 after the first submission you will not be able to improve it through revisions (however you can still get feedback).